भारतीय मानक
Indian Standard

IS 19003 : 2022

रिडिस्पर्सिबल पॉलिमर पाउडर — विशिष्टि

Re-Dispersible Polymer Powder — Specification

ICS 87.060.20

© BIS 2022

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

December 2022 **Price Group 6**

Raw materials for Paints, Varnishes and Related Products Sectional Committee, CHD 21

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Raw materials for paints, Varnishes, and Related Products Sectional Committee had been approved by the Chemical Division Council.

Re-dispersible polymer powders are polymer emulsions which have been converted by a series of process such as high temperatures and pressures, spray drying and surface treatment to powdered thermoplastic resin materials. When mixed with water, these powdered organic binders can redisperse in water back into new emulsions with essentially identical properties to the original copolymer emulsion

It is used as binder in wall putties as a key raw material for interior and exterior surface finishing in houses, office building and various constructing activities.

The Committee responsible for formulation of this standard is listed in Annex F. For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

RE-DISPERSIBLE POLYMER POWDER — SPECIFICATION

1 SCOPE

This standard prescribes the requirements, methods of sampling and test for polymeric additive (Re-dispersible polymer powder) for making Putty for use in internal or external plastered surfaces.

2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

3 TERMINOLOGY

For the purpose of this standard, definitions given in IS 1303 and following shall be apply.

3.1 Tensile Stress — A stress applied to stretch a test piece (specimen).

3.1 Tensile Strength — The maximum tensile stress applied in stretching a specimen to rupture.

3.2 Elongation — The elongation at which rupture occurs in the application to continued tensile stress

4 REQUIREMENTS

4.1 Form and Condition

The material shall be in the form of a dry powder free from grit or in such a condition that it can be reduced to the powder form by crushing, without grinding action, under a palette knife.

4.2 Composition

Spray dried water dispersible polymer shall be key ingredient in composition. The product may contain inorganic filler and other additives.

4.3 Lead Restriction

The material shall not contain lead or compounds of lead or mixtures of both, as metallic lead more than 90 ppm, when tested for restriction from lead in accordance with IS 101(Part 8/Sec 5).

4.4 Toxic Heavy Metal Restriction

Product shall not be manufactured using mercury and mercury compounds, cadmium, chromium VI, arsenic, antimony, and their oxides. The material shall not contain more than 0.1 percent by weight in total of above toxic heavy metals in the form of natural impurities or impurities entailed by the production process which are contained in the raw material, when tested by the relevant Atomic Absorption Spectroscopic methods or by ICP method.

4.5 The material shall also comply with the requirements given in Table 1

Table 1 Requirement for Re-Dispersible Polymer Powder

Sl. No (1)	Test (2)	Requirement (3)	Method of Test (4)
i)	Bulk Density, kg/ m^3	400-600	IS 33
ii)	Particle Size, (Dry sieve test), percent detention on 200 mesh (75 µm), *Max*	65	Annex B
iii)	Moisture Content, percent by mass, *Max*	2	Annex C
iv)	Ash Content at 900 °C for 4 h, percent by mass, *Max*	24	Annex D
v)	Tensile Strength, MPa, *Min*	5	Annex E
vi)	Elongation, percentage	30	Annex E

5. PACKING AND MARKING

5.1 Packing

The material shall be suitably packed as agreed to between the purchaser and the supplier. Packing shall be such that material shall not absorb any moisture.

5.2 Marking

Each bag shall be marked with following:

a) Name of the material
b) Name of manufacturer
c) Batch number or Lot number in code or otherwise;
d) Month and year of manufacture
e) Trade-mark, if any
f) Weight of the material
g) Lead content, Max; and
h) A cautionary note as below:
    1) Keep out of reach of children.
    2) Dried film of this paint may be harmful if eaten or chewed.
    3) This product may be harmful if swallowed or inhaled.

5.2.2 *Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

6 SAMPLING

Representative sample of the material shall be drawn as prescribed in IS 33.

7 TESTS

7.1 Tests shall be conducted as prescribed in **4.4, 4.5** and **4.6**.

7.2 Quality of Reagents

Pure chemicals and distilled water (*see* IS 1070) shall be used.

NOTE — ‘Pure chemicals’ shall mean chemical that does not contain impurity, which affect the results of the analysis

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
IS 33 : 1992	Inorganic pigments and extenders for paints — Methods of sampling and test (*third revision*)
IS 101 (Part 8/ Sec5) : 2022	Methods of sampling and test for paints, varnishes and related products: Part 8 Tests for pigments and other solids: Section 5 Lead restriction test (*fourth revision*)
IS 460 (Part 1) : 2020	Test Sieves — Specification: Part 1 Wire Cloth Test Sieves (*fourth revision*)
IS 1070 : 1992	Reagent grade water — Specification
IS 1303 : 1983	Glossary of terms relating to paints (*second revision*)

ANNEX B

[*Table* 1 *Sl No.* ii)]

PARTICLE SIZE DISTRIBUTION

B-1 GENERAL

The residue on sieve from a sample will be determined by sieving the material through the required micron sieve.

B-2 APPARATUS

B-2.1 Test Sieve — IS Sieve of 75 µm *see IS :* 460 (Part 1) prepared for the test by removing any film, grease or other water repellent material and then by drying.

B-2.2 Hog Bristle — approximate diameter 5 mm thick, 20 mm wide, 35 mm long.

B-2.3 Weighing Machine-a balance accuracy 0.0001 g of the weight of the sample to be weighed

B-2.4 Ro-Tap

B-3 PROCEDURE

Weigh accurately 10.0 g of the material and transfer it to the test sieve. Cover the sieve and screen the material in a Ro-Tap or a similar machine for 20 min, two small square rubber cubes are introduced along with the material on the sieve to facilitate the breaking-up of any soft -lumps of the caked material. After 20 min stop the machine and brush the residue on the sieve into a tared weighing dish. Weigh the dish and determine the mass of the residue.

B-4 CACULATION

Material passing through specified IS Sieve, percent by mass = $100\left(1-\frac{m}{M}\right)$.

where

m = Mass in g of the material retained on the-test sieve; and
M = Mass in g of the material taken for the test.

ANNEX C

[*Table* 1 *Sl No.* iii)]

MOISTURE CONTENT

C-1 GENERAL

The objective of this test is to evaluate the spray dried property for volatiles (water mass) of the Re-dispersible polymer powder on loss of evaporation to determine its stability at dry state.

C-2 PRINCIPAL

A method commonly used for moisture content determination is the loss-on-drying method (LOD). It is used to specify many major quality specifications. This is based on the thermogravimetric principle, in which a substance is heated until no more weight is lost, that is, it is completely dry. Loss on drying refers to release of volatile matter such as water content, and carbon dioxide (CO_2).

C-3 APPARATUS

C-3.1 Hot air Oven — Capable to maintain 102 °C ± 2 °C.

C-3.3 Petri Dish

C-3.3 Analytical Balance — A balance accuracy 0.0001 g of the weight of the sample to be weighed.

C-3.3 Desiccator — Containing an efficient desiccant.

C-3 PROCEDURE

Dry a glass petri dish in hot air oven at 102 °C ± 2 °C for 10 to 15 minutes, then cool it in a desiccator to room temperature. Weigh empty glass petri dish (w_1). Transfer approximately 1 g of sample to the dish, then weigh the dish plus sample (w_2). Place the dish plus sample in hot air oven at 102 °C ± 2 °C for two hours, then remove the dish and cool it in a desiccator to room temperature. Reweigh the dish plus dried sample (w_3).

C-4 CALCULATION

$$\text{Moisture content, percent} = \frac{(\mathrm{w}_2 - \mathrm{w}_3) \times 100}{(\mathrm{w}_2 - \mathrm{w}_1)}$$

ANNEX D

[*Table* 1 *Sl No.* iv)]

ASH CONTENT

D-1 APPARATUS

D-1.1 Muffle Furnace — Capable of maintaining the temperature up to 1 000 °C.

D-1.2 Silica Crucible

D-1.3 Analytical Balance — A balance accuracy 0.000 1 g of the weight of the sample to be weighed.

D-1.4 Desiccator — containing an efficient desiccant.

D-1.5. **Tongue**

D-2 PROCEDURE

Dry a silica crucible in hot air oven at 102 °C ± 2 °C for 10 min to 15 min, then cool it in a desiccator to room temperature. Weigh accurately dried silica crucible (w_1). Transfer 2 g ± 0.5 g sample into crucible through spatula and weigh the sample plus crucible (w_2). Keep the crucible in Muffle furnace. Switch on the Muffle furnace. Maintain furnace temperature 900 °C ± 25 °C and position for 4 hr. After 4 hr, switch off the furnace and wait for cooling for approximately 15 min. Transfer the crucible in desecrator for cooling. After cooling, weight the crucible on weighing balance (w_3).

D.3 CALCULATION

Ash content, percentage $=\frac{(W_3-W_1)\times 100}{(W_2-W_1)}$

ANNEX E

[*Table* 1 *Sl No.* v) *and* vi)]

TENSILE STRENGTH AND PERCENTAGE OF ELONGATION

E-1 GENERAL

This test method covers procedures used to evaluate the percentage of elongation and tensile strength property of Re-dispersible polymer powder**.**

E-2 APPARATUS

E-2.1 Testing Machine — Elongation test shall be made on a power-driven machine (Universal Testing Machine-UTM) equipped to produce a uniform rate of grip separation of 500 ± 50 mm/min**.** Testing machine shall have a suitable dynamometer and an indicating or recording system for measuring the change in length within ± 2 percent.

E-2.2 Grips — The testing machine shall have two grips, one of which shall be connected to the dynamometer.

E-2.3 Die — The shape and dimensions of the die for preparing dumbbell specimens shall conform to Fig 1. The inside faces in the reduced section shall be perpendicular to the plane formed by the cutting edges.

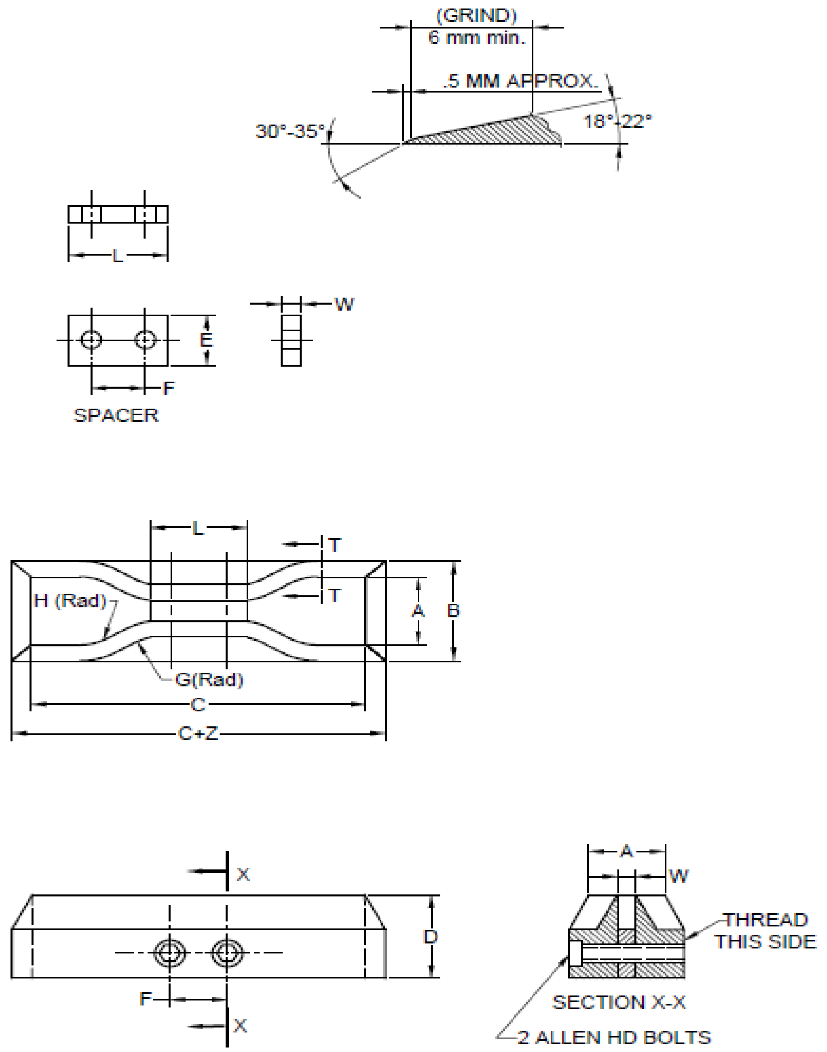

FIG. 1 STANDARD DIE FOR CUTTING DUMBBELL SPECIMENS

Dimensions of Standard Dumbbell Die

Sl No. *(1)*	*Dimension* *(2)*	*Units* *(3)*	*Tolerance* *(4)*	*Value* *(5)*
i)	A	mm	± 1	25
ii)	B	mm	max	40
iii)	C	mm	min	115
iv)	D	mm	± 6	32
v)	D-E	mm	± 1	13
vi)	F	mm	± 2	19
vii)	G	mm	± 1	14
viii)	H	mm	± 2	25
ix)	L	mm	± 2	33
x)	W	mm	+0.05, -0.00	6
xi)	Z	mm	± 1	13

E-2.4 Bench Marker — consist of a base plate containing two raised parallel projections.

E-2.5 Digital Weighing Balance

E-2.6 Trowel

E-2.7 Acrylic Panel

E-2.8 Wet Film Thickness Guage

E-2.9 Glass Beaker

E-2.10 Glass Rod

E-3 TEST TEMPERATURE

The standard temperature for testing shall be 27 °C ± 2 °C. Specimens shall be conditioned for at least 3 h when the test temperature is 27 °C.

E-4 PROCEDURE

Prepare Re-dispersible polymer (RDP) powder 50 percent solution by taking 20.0 g RDP and 20.0 g demineralised water in glass beaker (100 ml) and mix with glass rod. Keep this sample for 10 min. Apply prepared solution on acrylic panel with the help of trowel. Check the wet film thickness of film by using wet film thickness gauge and maintain 250 µm wet film thickness. Also take care that no foam shall observe on film. Cure prepared film at 27 °C ± 2 °C for 24 h. After 24 h curing prepares three Dumbbell shaped specimens by using Die (*see* Fig. 1). Mark the gauge length 33 mm on dumbbell specimens. Perform the test on each of specimens one by one in universal testing machine (UTM) at the rate of grip separation 500 mm/min ± 50 mm/min. Record the force at the elongation (that is at the time of rupture) and the elongation measurement is preferably through the use of an extensometer, an autographic mechanism or a spark mechanism. For the passing the test readings of the two specimens shall be meet the requirement.

E-5 CALCULATION

Percentage of Elongation = (Change in length/Gauge length) x 100.

Tensile Stress = Force at rupture/Cross-section area of unstrained specimen

ANNEX F

(*Foreword*)

COMMITTEE COMPOSITION

Raw materials for Paints, Varnishes and Related Products Sectional Committee CHD 21

Organization(s)	*Representative(s)*
In personal capacity (Retired from IIT Bombay)	PROF A. S. KHANNA ***(Chairman)***
20 Microns Limited, Mumbai	DR HEMANG PATEL SHRI K. K. MISHRA (*Alternate*)
Asian Paints Limited, Mumbai	MR RAJEEV KUMAR GOEL DR SUBRAHMANYA SHREEPATHI (*Alternate*)
Atul Limited, Gujarat	DR MAHESH SONI DR JAYESH JOSHI (*Alternate*)
Berger Paints India Limited, Kolkata	SHRI T. K. DHAR SHRI SWAGATA CHAKRABORTY (*Alternate*)
Aditya Birla Group, Mumbai	DR R. K. SINGH SHRI OM PRAKASH GAUTAM (*Alternate*)
Central Electro Chemical Research Institute, Karaikudi	SHRI C. ARUNCHANDRAN SHRI D. SHERWOOD (*Alternate*)
Clariant Chemicals (India) Ltd., New Delhi	SHRI NITIN VAIDYA SHRI UMESH KAPOOR (*Alternate*)
Consumer Voice, New Delhi	SHRI M. A. U. KHAN SHRI B. K. MUKHOPADHAYA (*Alternate*)
Harcourt Butler Technical University, Kanpur	DR P. K. KAMANI DR ARUN MAITHANI (*Alternate*)
Heubach India, Mumbai	SHRI J I SEVAK SHRI DHARMESH BHATT (*Alternate*)
Hindustan Zinc Limited, Delhi	SHRIMATI PAYAL CHAUHAN
Institute of Chemical Technology, Mumbai	PROF ANAGHA SABNIS PROF P. A. MAHANWAR (*Alternate*)
Indian Chemical Council, Delhi	REPRESENTATIVE
Indian Institute of Chem. Technology, Hyderabad	DR RAMANUJ NARAYEN DR PRATYAY BASAK (*Alternate*)
Indian Lead Zinc Development Association, New Delhi	SHRI K. SRIDHAR
Indian Small Scale Paint Association, Mumbai	SHRI MUKUND HULYALKAR SHRI MUKESH GOYAL (*Alternate*)
Institute of Minerals & Materials Technology	REPRESENTATIVE
J J Chemicals, Vadodara	REPRESENTATIVE
Kansai Nerolac Paints Limited Mumbai	SHRI LAXMAN NIKAM SHRI MANOJ KUMAR SOMANI (*Alternate*)
National Test House, Ghaziabad	REPRESENTATIVE
Naval Materials Research Laboratory, Maharashtra	REPRESENTATIVE
Office of Micro, Small & Medium Enterprises, New Delhi	SHRI SUNIL KUMAR NEWAR SHRI SANTOSH KUMAR (*Alternate*)

Organization(s)	*Representative(s)*
Rubamin Limited	Representative
Shalimar Paints Limited	Shri Gokul C. Sutradhar Shri Chinmaya Nayak (*Alternate*)
Shriram Institute of Industrial Research	Shri A. K. Majumdar
SSPC India Chapter	Shri Subhajit Bhattacharya, Shri Kaushik Duari (*Alternate*) Dr. Buddhadeb Duari (*Young Professionals*)
University Institute of Chemical Technogy, Jalgaon	Prof Ravindra Puri
Vapi Oxide Colours Private Limited (VOXCO), Vapi	Shri Ishan Raveshia Shrimati Minal Mayekar (*Alternate*)
Director General, BIS	Shri Ajay K. Lal Scientist 'E'/Director And Head (Chemical Department)[Representing Director General, BIS (*Ex-officio*)]

Member Secretary
Shri Pushpendra Kumar
Scientist 'B' Assistant Director
(Chemical Department), BIS

Working group responsible for formulation this standard

Organization	*Representative(s)*
In personal capacity (Retired from IIT Bombay)	Prof A. S Khanna, (*C**onvenor***)
Asian Paints, Mumbai	Dr Subrahmanya Shreepathi
Akzo Noble Indian Limited, Mumbai	Shri Sanatan Hazra
ICT, Mumbai	Prof P. A. Mahanwar
Indofil Industries Limited, Mumbai	Dr Amrita Singh Shri Prashant Surve

This Page has been Intentionally left blank

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 2016 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

This Indian Standard has been developed from Doc No.: CHD 21 (17979).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	2821 8093

Branches : AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.

Published by BIS, New Delhi